Tutorial
H-1000-5310-01-A

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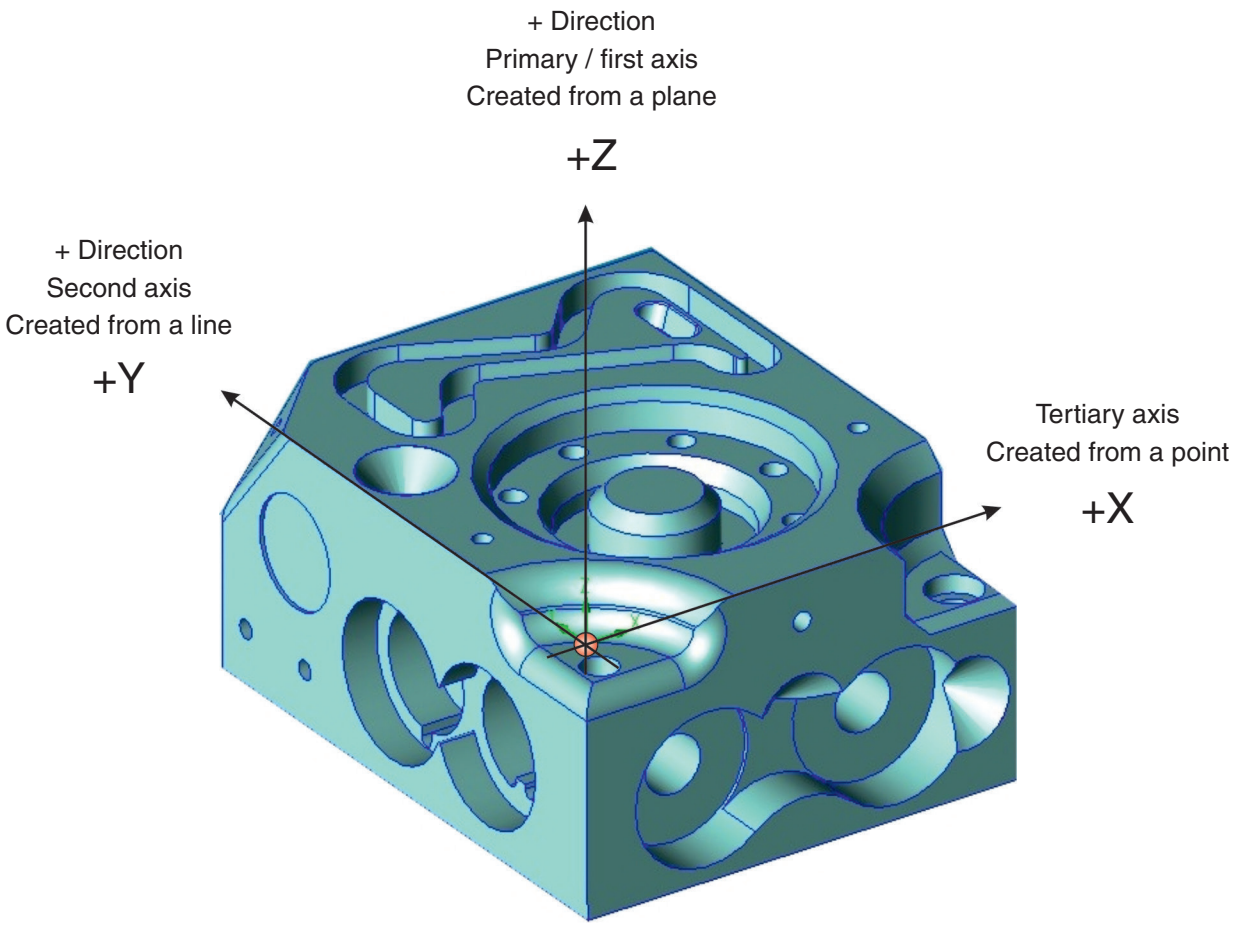
Part alignment - plane, line and point (CAD)



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Renishaw part no: H-1000-5310-01-A

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Part alignment - plane, line and point (CAD)

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1 Part alignment - plane, line and point (CAD)

1.1 Tutorial pre-requisites

- The student should be familiar with the ‘Principles of part alignment’

1.2 Tutorial objectives

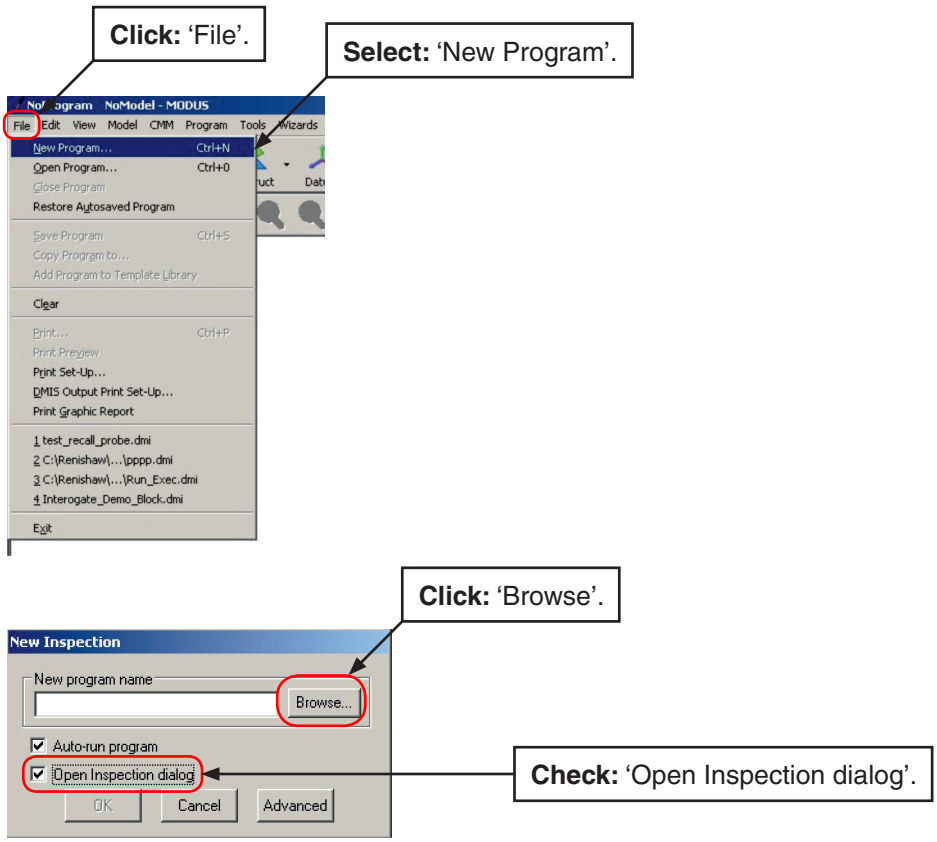
- Introduction to the fundamentals of creating a MODUS inspection program
- Concepts and definitions of nominal and actual features
- Familiarisation with text (DMIS) based programming
- Introduction of basic alignment operations

2 Introduction

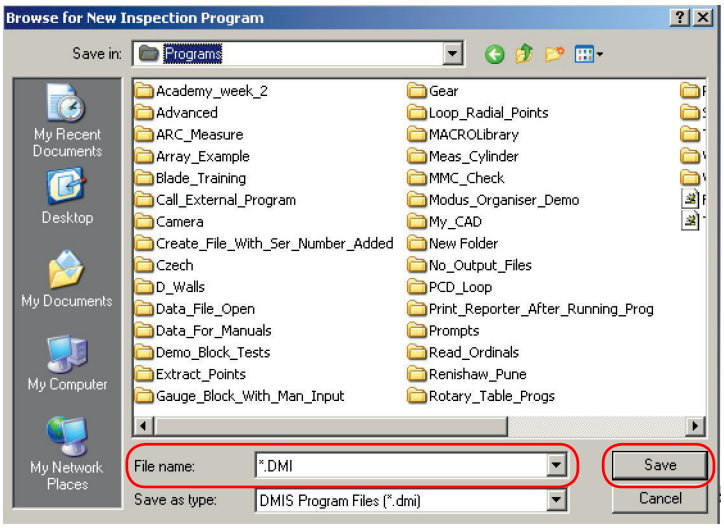
This tutorial introduces the student to manual measurement of features on the Renishaw training block and basic concepts of prismatic part alignment.

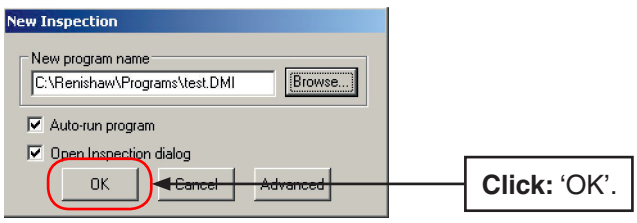
This tutorial will make use of a CAD model for feature nominal definition and visualisation purposes.

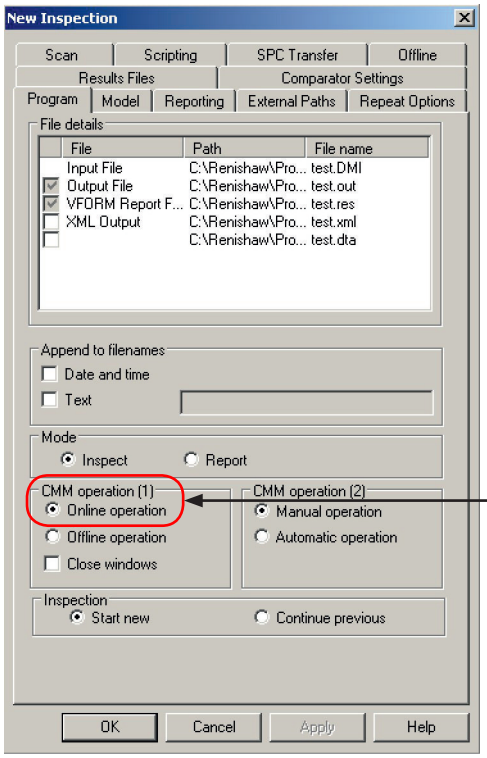
3 Create a new program



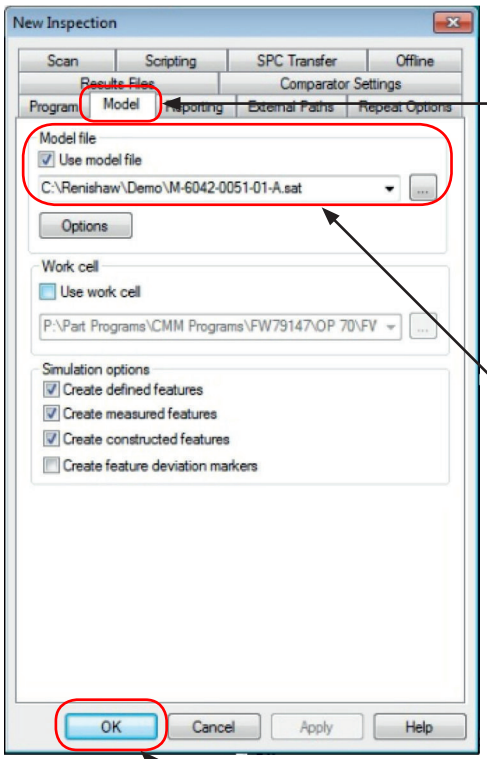
Enter the new program name in ‘File name’ then click ‘Save’ to continue:







Check: 'Online operation'.

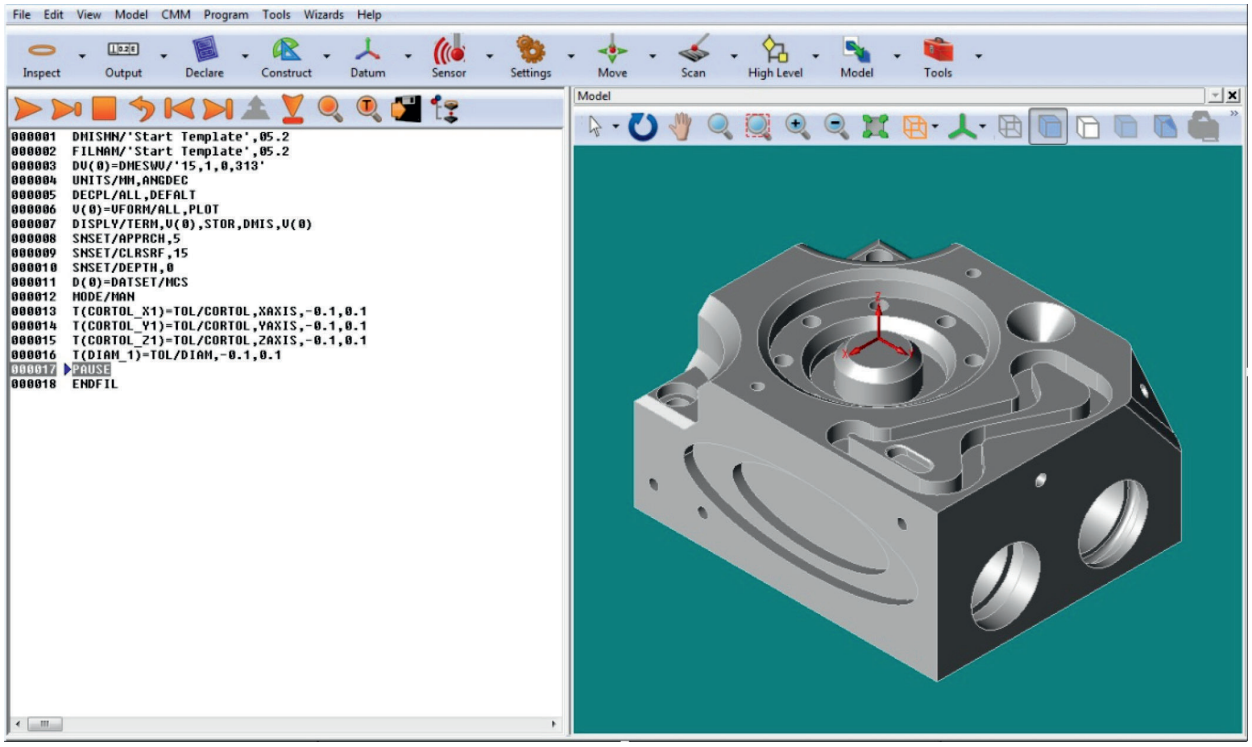


Select: 'Model' tab.

Check: 'Use model file' and browse to the correct model.

Click: 'OK' to continue.

The following header will be inserted into the program with the selected model:

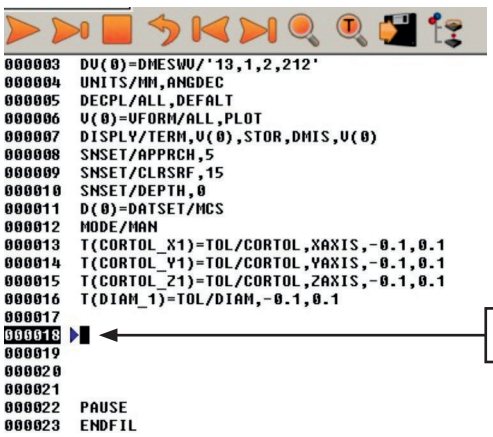


NOTE: This header can be edited to suit specific requirements. It can be found in:-

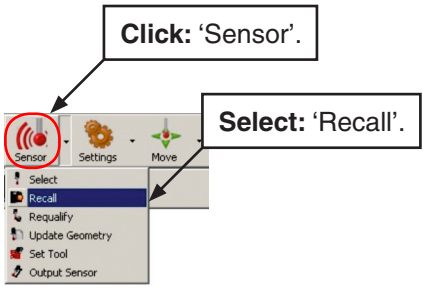
C:\Program Files\Renishaw\Modus\n,n\Template.dmi

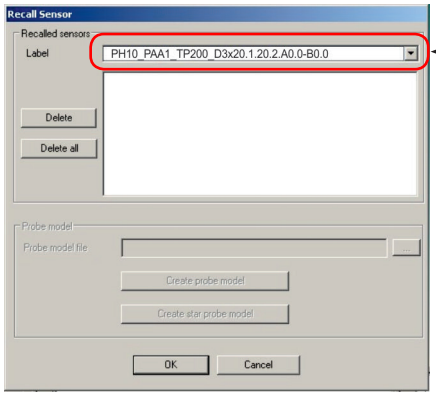
Next insert some line spaces to make the program easier to read. Press ctrl I

Enter a space here and then press return.

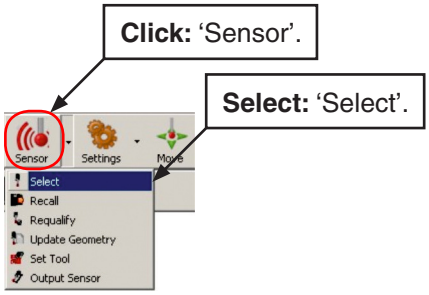


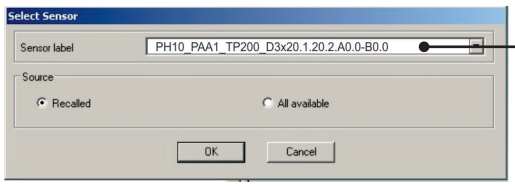
Place the cursor on line 000018.





Select the required sensor from the drop down menu.





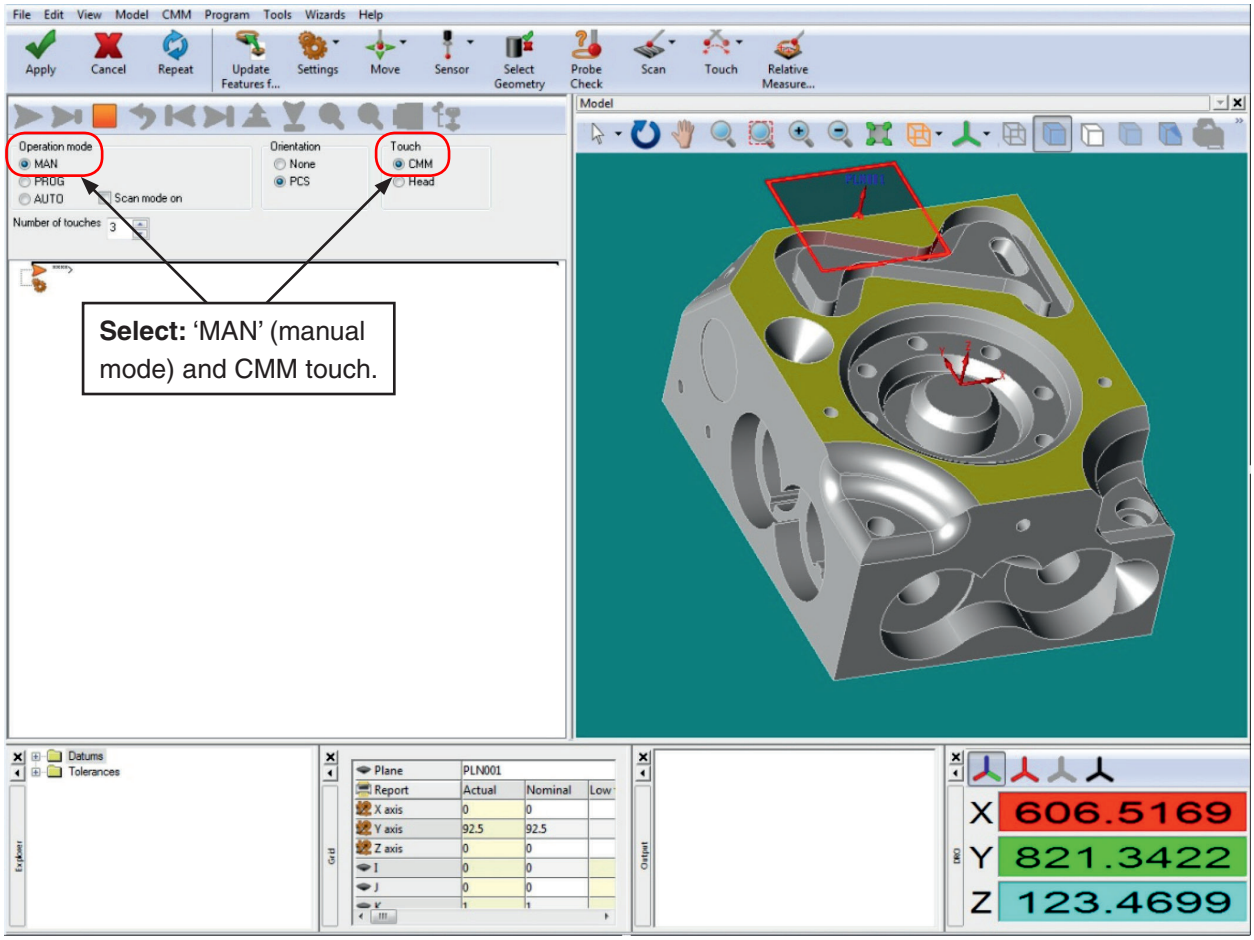
Select the required sensor from the drop down menu.

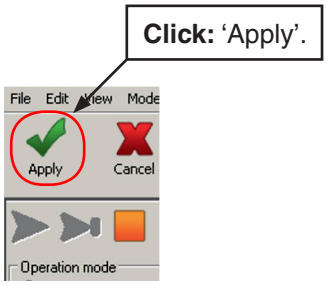
```
000012  MODE/MAN
000013  T(CORTOL_X1)=TOL/CORTOL,XAXIS,-0.1,0.1
000014  T(CORTOL_Y1)=TOL/CORTOL,YAXIS,-0.1,0.1
000015  T(CORTOL_Z1)=TOL/CORTOL,ZAXIS,-0.1,0.1
000016  T(DIAM_1)=TOL/DIAM,-0.1,0.1
000017
000018  RECALL/SA(PH10_PAA1_TP200_D3x20.1.20.2.A0.0-B0.0)
000019  SNSLCT/SA(PH10_PAA1_TP200_D3x20.1.20.2.A0.0-B0.0)
000020
000021
000022
000023  PAUSE
000024  ENDFIL
```

The program will now have two additional lines which recalls and selects the tool.

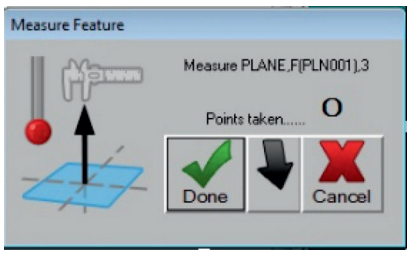
4 Measure a plane, line and point

Select the plane to inspect:

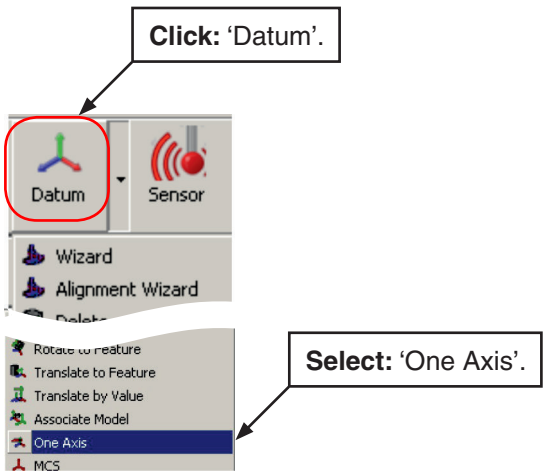


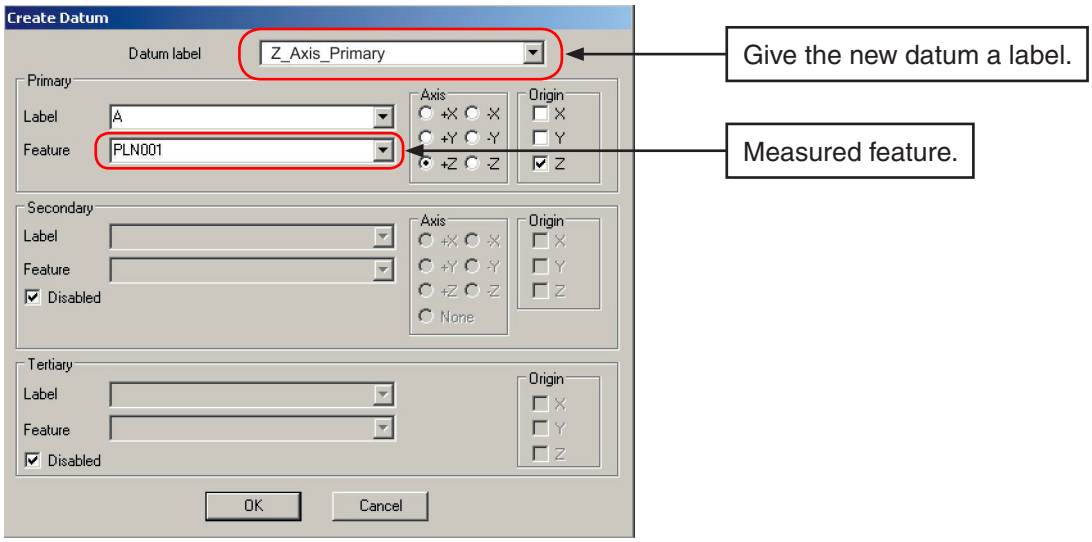


Now take three points on the plane:

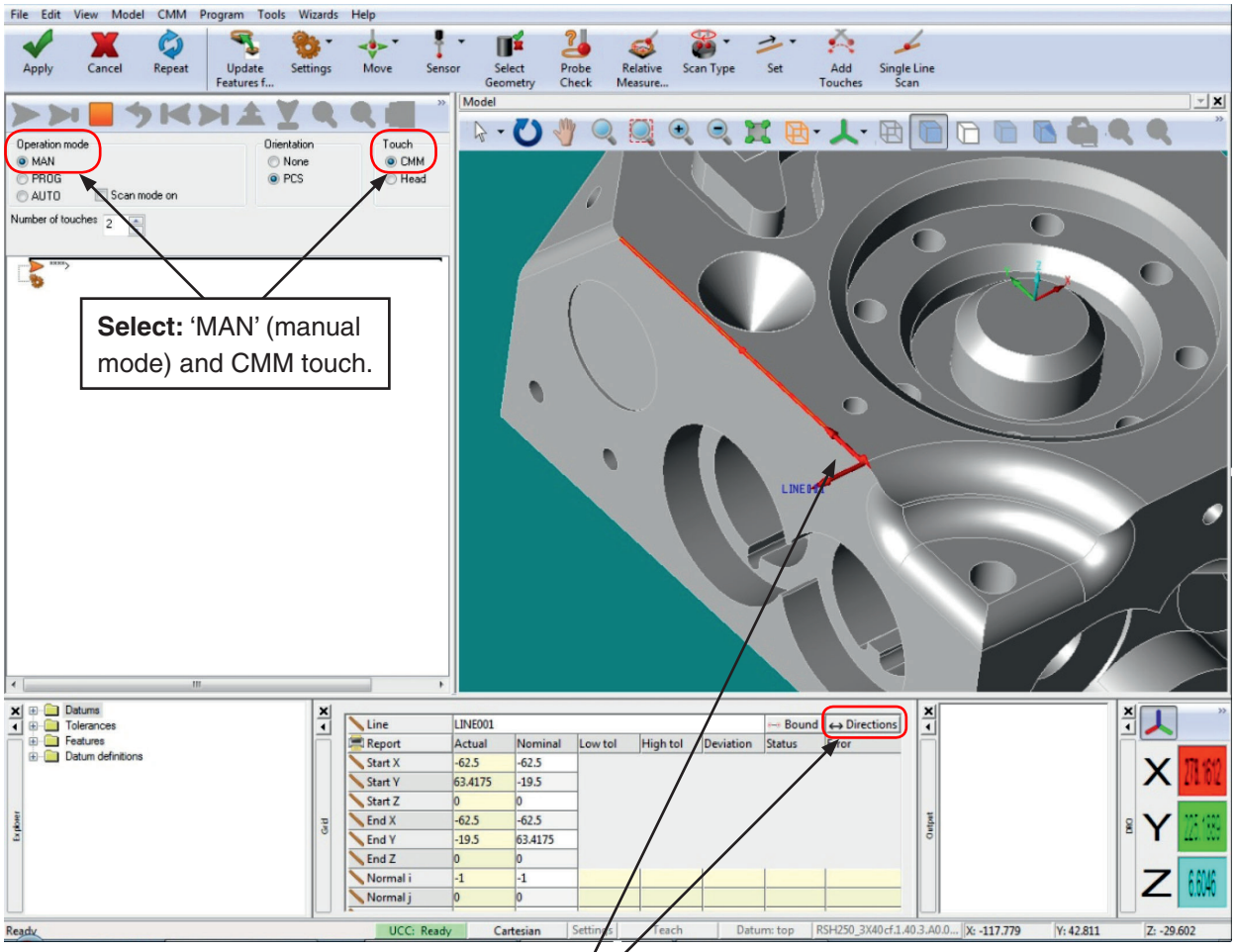


To create a primary axis on this feature click ‘Datum’ then select ‘One Axis’:



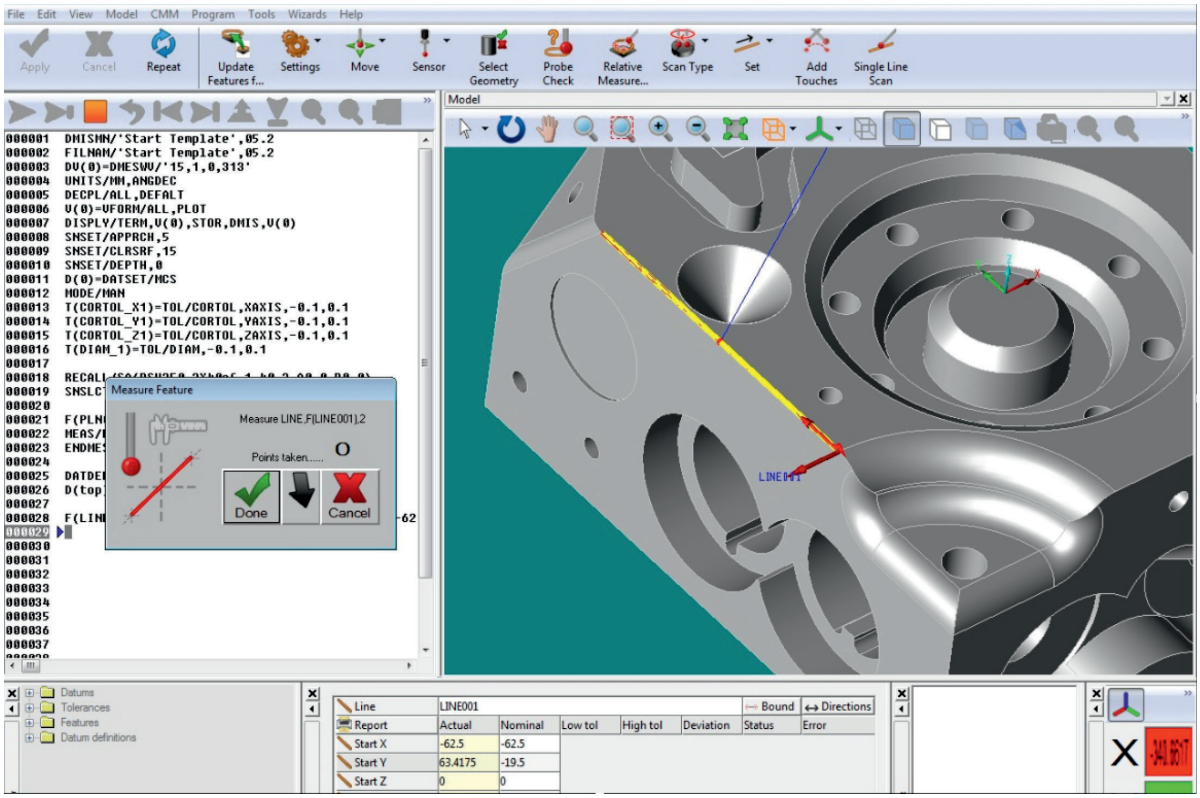


Select the line to inspect:

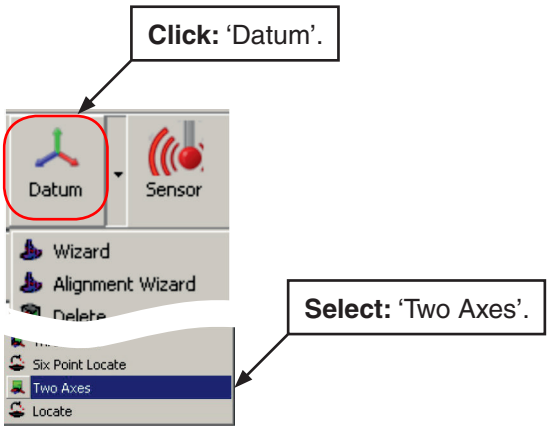


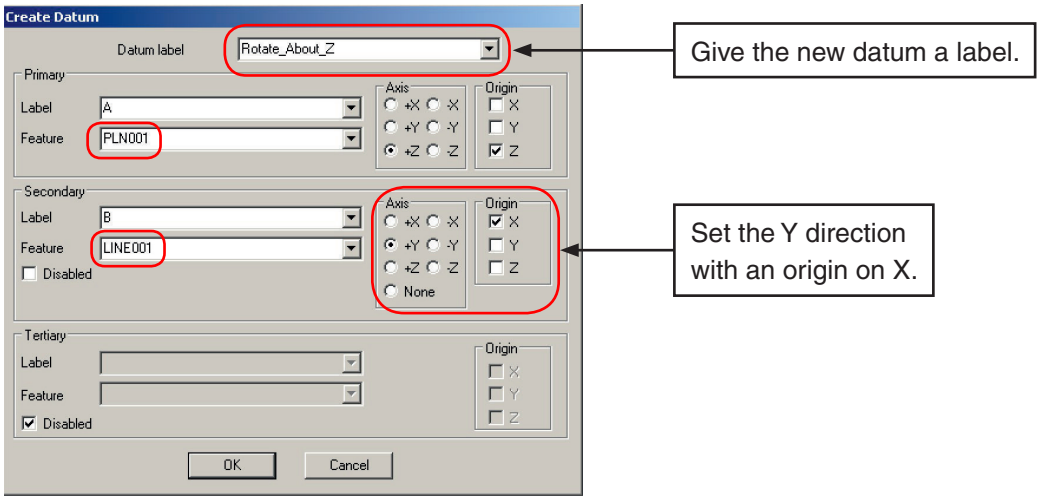
NOTE: It is very important to take note of the direction when taking the points i.e. front to back, back to front, left to right, right to left, + to - and - to +. This has a direct effect on the vector of the measured line and subsequent orientation of the part. If the next part is measured in the opposite direction then the part coordinate system would be rotated 180 degrees away from the original.

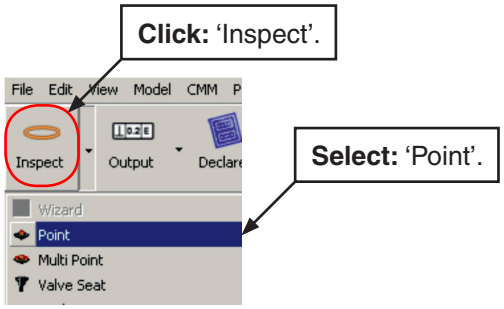
Measure feature:

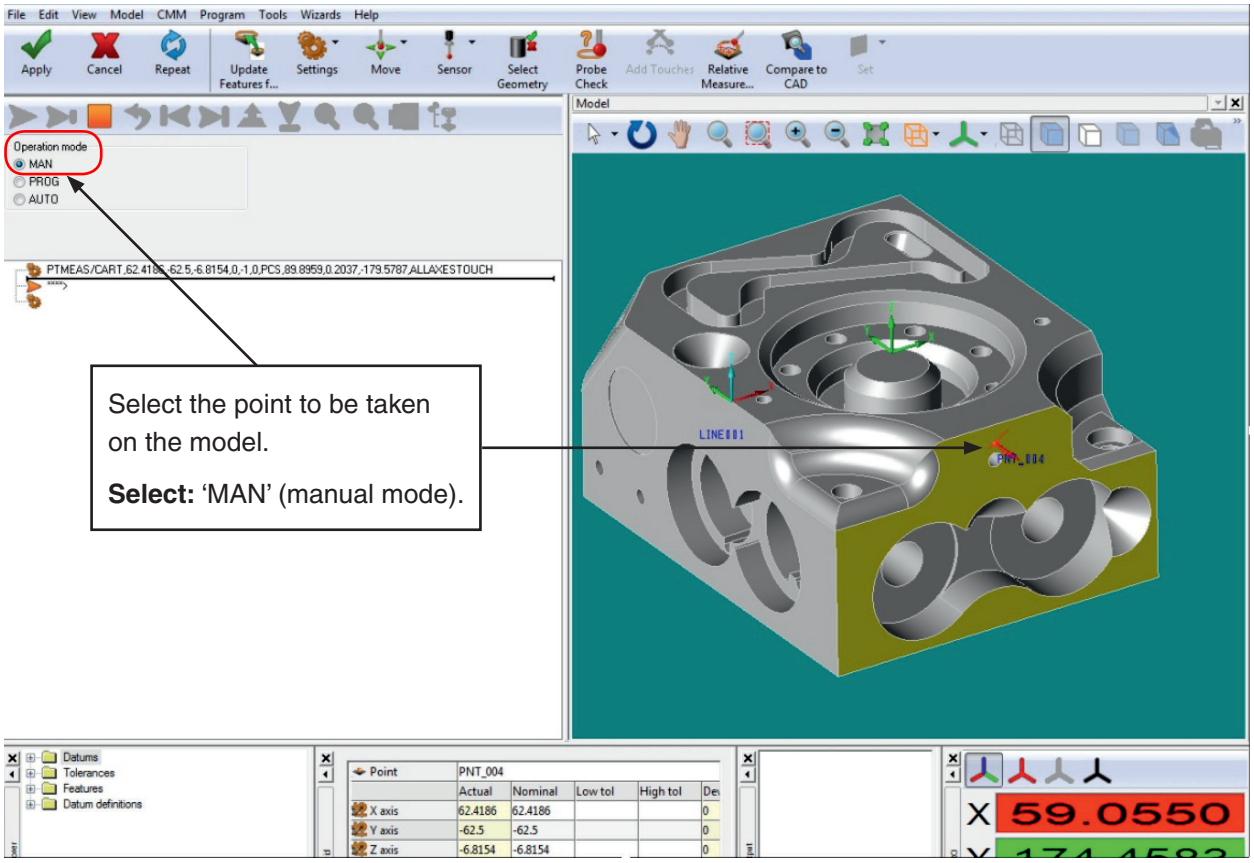


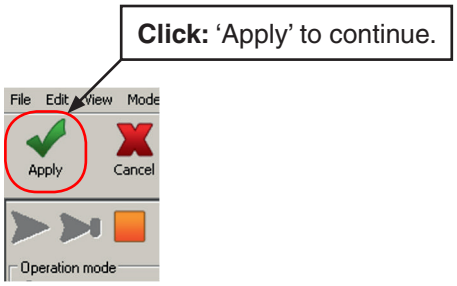
To create a secondary axis on this feature click on ‘Datum’ then select ‘Two Axes’:



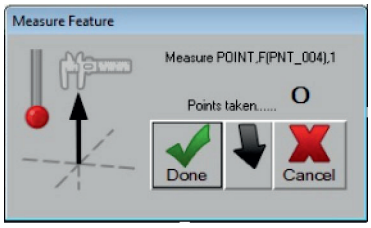

Create Datum
Datum label
Rotate_About_Z
Primary
Label
A
Feature
PLN001
Axis
Origin
Secondary
Label
B
Feature
LINE001
Disabled
None
Tertiary
Label
Feature
Disabled
OK
Cancel
Give the new datum a label.
Set the Y direction with an origin on X.


Click: 'Inspect'.
File Edit View Model CMM P
Inspect
Output
Wizard
Point
Multi Point
Valve Seat
Select: 'Point'.

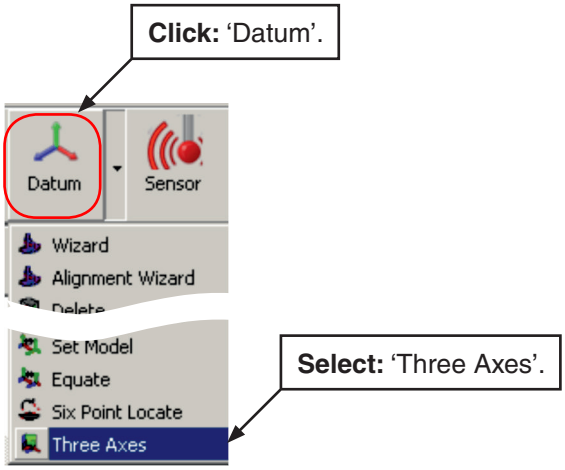

File Edit View Model CMM Program Tools Wizards Help
Apply
Cancel
Repeat
Update Features f...
Settings
Move
Sensor
Select Geometry
Probe Check
Add Touches
Relative Measure...
Compare to CAD
Set
Model
Operation mode
MAN
PROG
AUTO
Select the point to be taken on the model.
Select: 'MAN' (manual mode).
Datums
Tolerances
Features
Datum definitions
Point
PNT_004
Actual
Nominal
Low tol
High tol
X axis
Y axis
Z axis
X 59.0550

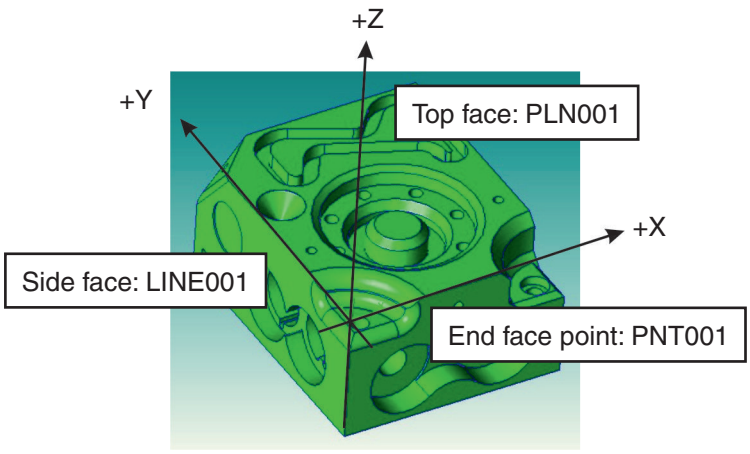


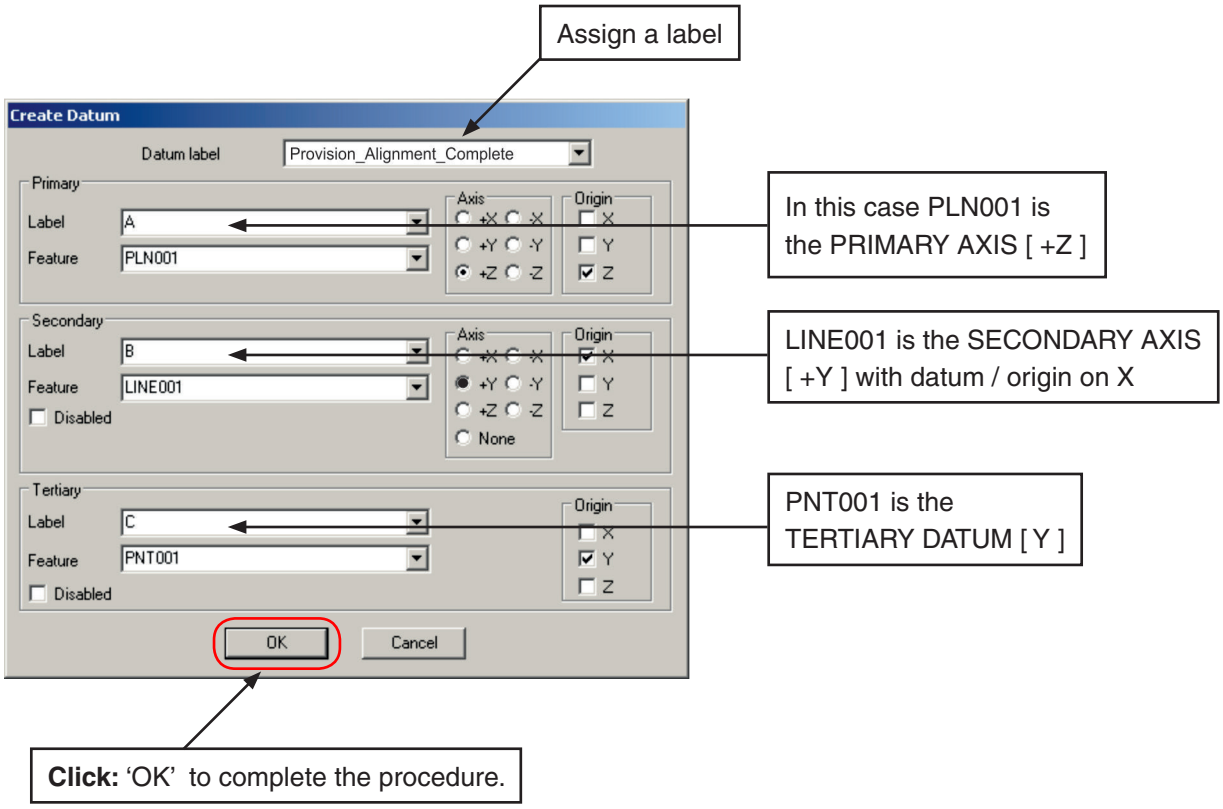
Measure feature:



To complete the alignment using the features measured click 'Datum' then select 'Three Axes':







Finally click on 'Datum' then select 'Save' to complete the alignment process.

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